REMARKS

In the Office Action mailed February 7, 2007, claims 1-20 were rejected. Claims 1-3 and 6-20 were rejected under 35 U.S.C. §103(a) as being obvious over Mohajerani et al. (U.S. Pat. No. 6,381,101) in view of Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833). Claims 4 and 5 were rejected under 35 U.S.C. §103(a) as being obvious over Mohajerani et al. in view of Nagahiro et al. in further view of Yim et al. (U.S. Pat. No. 6,950,282).

In general, the remarks below explain how the February 7, 2007 Office Action interprets the cited references in a manner inconsistent with the current claim language with respect to terms such as "head gimbal assembly", "endcap" and "cantilevered". For instance, head gimbal assembly components are incorrectly cited as actuator arms, prior art load beams are incorrectly cited as "endcaps", and structures affixed at all ends are incorrectly cited as being "cantilevered". In other words, the Office Action inaccurately applies those terms to the cited references, because the cited references disclose different structures and different configurations from those of the present invention as claimed. As explained further below, the text of the cited references supports the usage of those terms in the present claims.

Claim Rejections - 35 U.S.C. §103(a)

Claims 1-3 and 6-20 were rejected under 35 U.S.C. §103(a) as being obvious over Mohajerani et al. (U.S. Pat. No. 6,381,101) in view of Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833).

Amended independent claim 1 relates to an endcap for use on an actuator arm carrying a single head gimbal assembly, and requires a body of the endcap connected to the actuator arm and a shielding feature extending from the body in a cantilevered configuration for reducing windage excitation of the head gimbal assembly.

Amended independent claim 11 requires an actuator arm, a head gimbal assembly connected to a first side of the actuator arm, and a shield having a first portion attached to the actuator arm and a second cantilevered portion that extends relative to an edge portion of the head gimbal assembly for

reducing airflow excitation of the head gimbal assembly. According to amended independent claim 11, the shield is attached to a second side of the actuator arm that is opposite the first side of the actuator arm.

Amended independent claim 19 relates to a shielded head actuation system and requires a rotatable actuator arm, a head gimbal assembly attached to a first side of the actuator arm, a rotatable magnetic disc, and an endcap that includes a body and a symmetrically balanced shape feature. Amended independent claim 19 requires that the body be attached to a second side of the actuator arm opposite the head gimbal assembly such that the shape feature is positioned adjacent to the head gimbal assembly in a cantilevered configuration to reduce airflow excitation of the head gimbal assembly.

Mohajerani et al. discloses a flexure 116 that includes a load beam 144 having a distal end 146 that supports a slider 120 and an opposite end 148 attached to an actuator arm 114. (Mohajerani et al., col. 4, ll. 52-64; col. 6, ll. 53-56; FIGS. 1, 2 and 4). The flexure 116 also includes a flex cable 152 attached to the load beam 144, and the flex cable 152 in turn includes a gimbal insert 158 at the distal end 146 of load beam 144. (Mohajerani et al., col. 4, line 57 to col. 5, line 2; col. 6, ll. 53-67; FIGS. 1-4). The flexure 116 and the slider 120 form a head gimbal assembly. Airfoils 164,264 are connected to the load beam 144 in a middle portion located between the distal and opposite ends 146 and 148 of the load beam 144, and airfoils 364 are connected to the gimbal insert 158 at the distal end 146 of the load beam 144. (Mohajerani et al., col. 5, line 3 to col. 6, line 26; col. 6, ll. 46-52; col. 7, ll. 12-28; FIGS. 1-4). Each airfoil 164,264 includes a base 168,268 attached to the load beam 144 in the same plane as the load beam 144, and a body 166,266 that is attached to the base 168,268 at an angle. (Mohajerani et al., col. 5, ll. 36-59; FIGS. 1, 2 and 4). Each of the airfoils 364 is similar, with a base 368 attached to the gimbal insert 158, and a body 366 attached to the base 368 at an angle. (Mohajerani et al., col. 5, ll. 60-67; FIGS. 2-4). None of the airfoils 164,264,364 are connected to the actuator arm 114.

Nagahiro et al. discloses a carriage arm assembly (or actuator arm assembly) for a magnetic disk drive. Nagahiro et al. discloses a suspension 2 (or load beam) that supports a slider 3 and a magnetic head (not shown) at a "tip" or distal end of a carriage arm 7, and a restraint board 12 affixed

to the carriage arm 7. (Nagahiro et al., ¶¶16, 35 and 36; FIGS. 1-3). The restraint board 12 is a thin T-shaped structure in the embodiment shown in FIGS 1-3 of Nagahiro et al. (Nagahiro et al., ¶36; FIGS. 1-3). Opposing arms of the restraint board 12 are affixed to arm center portions 10a and 10B with viscoelastic materials 11 and a "residual end" of the restraint board 12 is affixed to an arm root portion 13 parallel to a disk 6. (Nagahiro et al., ¶¶16 and 36; FIGS. 1-3). In other words, the restraint board 12 is resiliently secured at a middle portion of the arm 7 such that the restraint board 12 has no free or cantilevered protrusions and is spaced from the suspension 2. A vibration damping effect is thereby produced as the viscoelastic material 11 converts shearing strain energy to heat, which is then dissipated. (Nagahiro et al., ¶37). This damping effect is dependent upon the restraint board 12 being completely fixed to the arm 7 in order to produce strain in the viscoelastic material 11. Nagahiro et al does not specifically disclose the position of the suspension 2 relative to the top and bottom faces of the arm 7, though in FIG. 2 the suspension 2 appears to extend from a middle portion of the arm 7 in between the top and bottom faces of the arm 7.

In further embodiments, Nagahiro discloses affixing a restraint-board-like damper body 15 of a different shape inside a hole 17 in each arm 7 of an assembly formed by a number of carriage arms 7. (Nagahiro et al., ¶¶40 and 47; FIGS. 3-6). None of the embodiments of Nagahiro et al. disclose reducing or preventing vibration by diverting airflow, but rather damping or dissipating vibrations that have developed in the disk drive. (See Nagahiro et al., ¶¶7, 13 and 17). Indeed, the function of the damping mechanism of Nagahiro et al. requires bending of the actuator arm due to vibration in order to provide a damping effect. (Nagahiro et al., ¶¶7, 13 and 17).

Mohajerani et al. and Nagahiro et al., alone or in combination, do not disclose, teach or suggest each and every element of amended independent claims 1, 11 and 19, which require some structure that is attached to (claims 11 and 19) or connected to (claim 1) an actuator arm. The Office Action cites Mohajerani et al. as disclosing airfoils 164,264,364. However, the airfoils 164,264,364 of Mohajerani et

al. are not attached or connected to the actuator arm 114,[1] but instead, as discussed above, are attached either to a middle portion of the load beam 144 or to a gimbal insert 158. The load beam 144 and the gimbal insert 158 are different from the actuator arm 114 as disclosed by Mohajerani et al.

Also, with respect to independent claim 1, the airfoils 164,264,364 Mohajerani et al. are not endcaps. Independent claim 1 has hereby been amended to clarify that the claim recites endcap structures. The term "endcap" is known in the art to refer to structures mechanically connected to the ends of actuator arms at or near the location where load beams/suspensions/flexures are connected, in order to provide balancing. (Specification, p. 2, line 21 to p. 3, line 9; p. 11, line 23 to p. 12, line 19). Airfoils connected to the middle portions of load beams or to gimbal inserts are not endcaps. The Office Action identifies the flexure 116 or load beam 144 of Mohajerani et al. as the body of an endcap. However, amended independent claim 1 recites a head gimbal assembly of which a load beam (or flexure) would be a part (see dependent claim 8). Therefore, to construe a load beam to be an endcap runs counter to the express language of the claim, as well as against the meaning of the terms that a person of ordinary skill in the art would apply. Furthermore, the Office Action expressly admits that "Mohajerani et al fails to specifically disclose: An endcap." at page 8 of the 2/7/2007 Office Action, despite assertions elsewhere in that Office Action that state that Mohajerani et al. does disclose an endcap. The structures disclosed by Mohajerani et al. must either include an endcap or not include an endcap, and it is believed that, properly construed, Mohajerani et al. does not disclose an endcap as recited by the present claims.

With respect to amended independent claims 11 and 19, a head gimbal assembly and an endcap or shield are attached to an actuator arm at opposite first and second sides, respectively, of the actuator arm. The Office Action discusses proximate and distal portions of structures shown by Mohajerani et al. where airfoils 164,264 are attached, but proximate and distal ends--of the actuator arm or of the head gimbal assembly--are not recited by amended independent claims 11 and 19. Rather, the language of those claims relates to opposites sides of the actuator arm where the head gimbal assembly and

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[1]The Office Action appears to admit this on pp. 8-9.

the endcap or shield are attached. Moreover, the Office Action identifies items 144 and 116 of Mohajerani et al. as collectively forming an actuator arm., but the text of that reference clarifies that only item 114 is an actuator arm. Item 116 of Mohajerani et al. is a flexure, and the flexure 116 (including load beam 144) is part of a head gimbal assembly that is different from an actuator arm (which is only item 114 of Mohajerani et al.). Therefore, attachments of the airfoils 164,264 to the flexure 116 or its load beam 144 (i.e., head gimbal assembly components) cited by the Office Action are irrelevant to the sides of the actuator arm where the head gimbal assembly and the endcap or shield are respectively attached, as recited by amended independent claims 11 and 19.

Furthermore, Nagahiro et al. does not disclose an endcap or any other shielding structure that is supported by or attached to an actuator arm. Nagahiro et al., instead, discloses a restraint board that is affixed to a middle portion of an actuator (or carriage) arm in order to provide a damping effect. The damping effect provided by the restraint board of Nagahiro et al. utilizes a viscoelastic material to dissipate vibration energy as heat. That viscoelastic material only functions when the restraint board is affixed to an actuator arm in a secure, flat configuration, and would not function properly if any end portion or protrusion of the restraint board had an unaffixed, cantilevered configuration. Moreover, the restraint board of Nagahiro et al. provides a mechanical damping function and is not configured in a way that provides an airflow or windage excitation shielding function as required by independent claims 1, 11 and 19. Also, with respect to amended independent claim 1, Nagahiro et al. does not disclose an endcap. Further, with respect to amended independent claim 1 and 11, Nagahiro et al. does not disclose a cantilevered portion or a cantilevered shielding feature that extends relative to a side of a head gimbal assembly.

In addition, there is no suggestion or motivation to combine Mohajerani et al. and Nagahiro et al. in the manner stated in the Office Action. The airfoils 164,264,364 of Mohajerani et al. function because those structures have body portions 166,266,366 that extend outward from the load beam 144 or gimbal insert 158 unattached at one end in an aerodynamic manner. In contrast, the restraint board 12

of Nagahiro et al. is completely fixed to the arm 7, and that completely affixed configuration of the restraint board 12 enables energy dissipation through the viscoelastic material 11. Such a proposed modification is not suggested by either reference, and would change the principle of operation of the references. It is well established that if a proposed modification of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the cited references are not sufficient to render relevant claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810 (CCPA 1959); MPEP 2143.01.

Thus, the cited references fail to disclose, teach or suggest each and every element of independent claims 1, 11 and 19, and the rejections of those claims under §103 should be withdrawn. Notification to that effect is requested.

Claim 2 has hereby been canceled, making the rejection of that claim moot.

Claims 3 and 6-10 depend from independent claim 1 and include all of the limitations of that base claim, claims 12-18 depend from independent claim 11 and include all of the limitations of that base claim, and claim 20 depends from amended independent claim 19 and includes all of the limitations of that base claim. Thus, for the reasons discussed above, dependent claims 3, 6-10, 12-18 and 20 are likewise allowable over the cited art, and the rejections under §103 should be withdrawn. Furthermore, dependent claims 3, 6-10, 12-18 and 20 contain additional limitations not disclosed, taught or suggested by the prior art of record.

For example, with respect to dependent claim 8, which recites that the shielding feature is structured to divert an airflow proximate to a critical portion of the flexible interconnect circuit of the head gimbal assembly, Mohajerani et al. does not disclose diverting airflow specifically with respect to a flexible interconnect circuit. Although Mohajerani et al. discusses airflow diversion generally, that reference does not discuss airflow diversion in the specific manner recited in dependent claim 8.

With respect to dependent claims 9 and 10, which each recite particular planes in which the shielding feature is defined relative to airfoil, Nagahrio et al. does not disclose the claimed structures. The Office Action argues that the restraint board 12 of Nagahiro et al. is three-dimensionally shaped for

controlling airfoil in either a X-Y plane parallel to the actuator arm (claim 9) or a X-Z plane parallel to the axis of rotation of the actuator arm (claim 10). However, as noted above, Nagahiro et al. does not relate to controlling airflow, but rather is a mechanical damping system. Nagahiro et al. fails to disclose the shape of shielding features in relation to particular directions of airflow. Furthermore, although the restraint board 12 of Nagahiro et al. has some small thickness, the shape of the restraint board is not a shape defined in a substantially X-Z plane, but instead is the T-shape defined in substantially the X-Y plane only.

With respect to dependent claim 12, which recites that the shield is configured as a baseplate connected to both an actuator arm and a load beam, the Office Action states that the bases 168,268,368 of the airfoils 164,264,364 of Mohajerani et al. constitute baseplates. However, as discussed above, the bases 168,268,368 of the airfoils 164,264,364 of Mohajerani et al. are connected to middle portions of the load beam 144 or gimbal insert 158 and are not connected to the actuator arm 114.

With respect to dependent claims 13 and 14, which recite that the shield comprises an endcap having a body that comprises the first portion of the shield and a symmetrical protrusion from the body that comprises the second (cantilevered) portion of the shield, the Office Action states that the restraint board 12 of Nagahiro et al. comprises an endcap having a symmetrical protrusion. However, as noted above, Nagahiro et al. does not disclose an endcap at all. Moreover, Nagahiro et al. does not disclose a symmetrical protrusion, or any protrusion at all. Rather, as discussed above, the symmetrical restraint board 12 is secured at all ends by viscoelastic material 11 (instead of being cantilevered), and therefore has no protrusion or protruding portion.

With respect to dependent claim 15, which recites that the shield comprises an endcap having a body and a plurality of protrusions from the body, the Office Action states that the load beam 144 (or 116) comprises an endcap body and the airfoils 164,264,364 comprise protrusions from the body. However, as discussed above, the load beam 144 is a part of a head gimbal assembly as defined by independent claim 11 from which claim 15 depends (see also claim 12). Furthermore, the load beam 144 is a different structure than an endcap, as discussed above.

Thus, all of dependent claims 3, 6-10, 12-18 and 20 are allowable over the cited art, and the rejections under §103 should be withdrawn. Notification to that effect is requested.

Claims 4 and 5 were rejected under 35 U.S.C. §103(a) as being obvious over Mohajerani et al. (U.S. Pat. No. 6,381,101) in view of Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833) in further view of Yim et al. (U.S. Pat. No. 6,950,282). Claims 4 and 5 depend from independent claim 1, and include all of the limitations of that base claim. Neither Mohajerani et al. nor Nagahiro et al. disclose, teach or suggest each and every element of independent claim 1, and Yim et al. does not supply the missing limitations. Thus, for the reasons discussed above with respect to independent claim 1, dependent claims 4 and 5 are likewise allowable over the cited art, and the rejections under §103 should be withdrawn.

CONCLUSION

All of the pending claims are in condition for allowance. Notification to that effect is requested. The Examiner is invited to contact the undersigned at the number below if such a call would in any way facilitate prosecution of the present application. The Commissioner is authorized to charge any additional fees associated with this paper or credit any overpayment to Deposit Account No. 11-0982.

Respectfully submitted,

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